

10/031240

531 Rec'd PCT/PTC 17 JAN 2002

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Roger W. WHATMORE, Paul B. KIRBY, Qingxin SU,
Eiju KOMURO

Application No.: New U.S. National Stage of
PCT/GB01/02292

Filed: January 17, 2002

Docket No.: 111675

For: IMPROVEMENTS TO FILTERS

PRELIMINARY AMENDMENT

Director of the U.S. Patent and Trademark Office
Washington, D. C. 20231

Sir:

Prior to initial examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please replace claims 4-16, 21-24, 27 and 29 as follows:

4. (Amended) An electric filter as described in claim 1, wherein the layer whose thickness is varied from one FBAR to another is the top electrode.
5. (Amended) An electric filter as described in claim 1, wherein the layer whose thickness is varied from one FBAR to another is the bottom electrode.
6. (Amended) An electric filter as described in claim 1, wherein the layer whose thickness is varied from one FBAR to another is an underlying membrane.
7. (Amended) An electric filter as described in claim 1, wherein the layer whose thickness is varied from one FBAR to another is an overlying dielectric layer.

8. (Amended) An electric filter as described in claim 1, wherein the layer whose thickness is varied from one FBAR to another is an overlying metal layer.
9. (Amended) An electric filter as described in claim 1, wherein the piezoelectric material is zinc oxide.
10. (Amended) An electric filter as described in claim 1, wherein the piezoelectric material is lead titanate zirconate.
11. (Amended) An electric filter as described in claim 1, wherein the piezoelectric material is aluminium nitride.
12. (Amended) An electric filter as described in claim 1, wherein the piezoelectric material is substantially lead scandium tantalum oxide.
13. (Amended) An electric filter as described in claim 1, wherein the piezoelectric material is substantially bismuth sodium titanium oxide.
14. (Amended) An electric filter as described in claim 1, wherein the metal electrodes are substantially gold.
15. (Amended) An electric filter as described in claim 1, wherein the metal electrodes are substantially aluminum.
16. (Amended) An electric filter as described in claim 1, wherein the metal electrodes are substantially platinum.
21. (Amended) An electric filter as described in claim 1, wherein the variation in the thickness of one of the layers is produced by etching by excimer laser pulses.
22. (Amended) An electric filter as described in claim 1, wherein the variation in the thickness of one of the layers is produced by wet etching.
23. (Amended) An electric filter as described in claim 1, wherein the variation in the thickness of one of the layers is produced by ion milling.

24. (Amended) An electric filter as described in claim 1, wherein the variation in the thickness of one of the layers is produced by reactive ion etching.

27. (Amended) An electric filter according to claim 25, wherein at least one additional layer is provided over the top electrode or under the bottom electrode.

29. (Amended) An electric filter according to claim 1 comprising a plurality of FBARs linked in series and a plurality of FBARs linked in parallel.

REMARKS

Claims 1 - 30 are pending. By this Preliminary Amendment, claims 4-16, 21-24, 27 and 29 are amended to remove multiple dependencies. Prompt and favorable examination on the merits is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. 1.121(c)(1)(ii)).

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Thomas J. Pardini
Registration No. 30,411

JAO:TJP/mlb
Attached: Appendix
Date: January 17, 2002

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461
--

APPENDIX

Changes to Claims:

The following are marked-up versions of the amended claims:

4. (Amended) An electric filter as described in claim 1 ~~any preceding claim~~, wherein the layer whose thickness is varied from one FBAR to another is the top electrode.
5. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 3~~, wherein the layer whose thickness is varied from one FBAR to another is the bottom electrode.
6. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 3~~, wherein the layer whose thickness is varied from one FBAR to another is an underlying membrane.
7. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 3~~, wherein the layer whose thickness is varied from one FBAR to another is an overlying dielectric layer.
8. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 3~~, wherein the layer whose thickness is varied from one FBAR to another is an overlying metal layer.
9. (Amended) An electric filter as described in claim 1 ~~any preceding claim~~, wherein the piezoelectric material is zinc oxide.
10. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 8~~, wherein the piezoelectric material is lead titanate zirconate.
11. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 8~~, wherein the piezoelectric material is aluminium nitride.
12. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 8~~, wherein the piezoelectric material is substantially lead scandium tantalum oxide.

13. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 8~~, wherein the piezoelectric material is substantially bismuth sodium titanium oxide.
14. (Amended) An electric filter as described in claim 1 ~~any preceding claims~~, wherein the metal electrodes are substantially gold.
15. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 13~~, wherein the metal electrodes are substantially aluminum.
16. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 13~~, wherein the metal electrodes are substantially platinum.
21. (Amended) An electric filter as described in claim 1 ~~any preceding claims~~, wherein the variation in the thickness of one of the layers is produced by etching by excimer laser pulses.
22. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 20~~, wherein the variation in the thickness of one of the layers is produced by wet etching.
23. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 20~~, wherein the variation in the thickness of one of the layers is produced by ion milling.
24. (Amended) An electric filter as described in claim 1 ~~any one of claims 1 to 20~~, wherein the variation in the thickness of one of the layers is produced by reactive ion etching.
27. (Amended) An electric filter according to claim 25 ~~or claims 26~~, wherein at least one additional layer is provided over the top electrode or under the bottom electrode.
29. (Amended) An electric filter according to claim 1 ~~any preceding claim~~ comprising a plurality of FBARs linked in series and a plurality of FBARs linked in parallel.